

TOP SECRET

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30 DEC 1965

MEMORANDUM FOR: Deputy Director for Science and Technology

SUBJECT: Remarks Related to FBI Letter
Dated 15 December 1965

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1. As far as is known no laser exists at this time, either in the US or any other country, capable of producing one billion joules of energy. The largest laser energy output known in the US as of December 1965 was [redacted]. Efforts to increase this energy output are underway, and lasers capable of a billion joules output are considered feasible provided numerous extremely difficult problems can be solved.

2. Even if a billion joule pulsed laser existed, its operation would not result in a blackout such as occurred in northeastern United States on November 9, 1965. Although a large amount of pulsed energy would be required to pump such a laser, no sudden drain on the power system would be experienced. The capacitor bank used to pump the laser could be charged over a relatively long period of time. Similarly, the discharge of the capacitor bank at the instant of laser "firing" would not cause any disruption of the power network because the "firing" circuit would be isolated from the charging circuit.

3. There is no known way of converting a laser beam into massive energy in space capable of destroying missiles or space vehicles. The laser beam would have to strike the vehicle or warhead in order to destroy it. Accomplishing this, in itself, involves problems of pointing, tracking and transmitting a laser beam over ranges in excess of 100 kilometers (62 miles).

4. It is possible that the reference to "Fireball" is related to the phenomenon seen over the northern US

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on December 9, 1965. This phenomenon was, from all available information a meteor. There is a possibility that the November 9th and December 9th dates were incorrectly related.

5. The laser program at the Physics Institute imeni P. N. Lebedev, AS-USSR, Moscow, appears to be concerned primarily with the physics aspects of lasers; that is, with the study of the various kinds of lasers themselves and with their characteristics and effects. As leaders of the laser program at this institute, A. M. Prokhorov and N. G. Basov also are concerned primarily with the study of lasers rather than with the direct application of lasers. Basov, for example, has devoted a considerable amount of his time during the past two years to the study of semiconductor lasers, particularly to methods of pumping these lasers (optical pumping by ruby lasers and electron beam pumping). He has obtained 30 kw output with a 3 Mw/cm^2 laser beam and has claimed laser action in semiconductor materials using a 50 kv, $1 \mu\text{sec}$, 50/sec electron beam.

6. During the same period Prokhorov has had a strong interest in the production of a very high temperature plasma by gas breakdown using lasers and is leader of a fairly large Soviet research program in this area of laser research. The laser used by Prokhorov was in the 1-2 Joule range with pulses of 30 nanoseconds (30×10^{-9} seconds) duration. Prokhorov has reported results indicating temperatures considerably in excess of one million degrees Kelvin. This is not yet in the area of any direct importance to weapons applications. Prokhorov's work could be connected with controlled thermonuclear studies. The significance of his work is mainly characterizing what goes on in discharges and plasmas produced by very intense focused laser light. Much remains to be learned by both the US and USSR in this area of research.

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7. While the Lebedev Physics Institute is recognized as a basic research facility, the possibility of its involvement in a classified laser weapons program exists, of course. Likewise, Basov and Prokhorov could be acting as consultants to a military laser program, but it appears highly unlikely that they are spending the major portion of their time in military work. They have published regularly in the non-military fields noted above and have read papers on these subjects at important international quantum electronics conferences during the past few years; for example, at Paris in 1963, and at Puerto Rico in 1965.

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DONALD F. CHAMBERLAIN
Director of Scientific Intelligence

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